

Claims

Sub A<sup>1</sup>  
1. A solid state p-n heterojunction comprising an electron conductor and a hole conductor, characterised in that it further comprises a sensitizing semiconductor, said sensitizing semiconductor being located at an interface between said electron conductor and said hole conductor.

2. A heterojunction as claimed in claim 1, wherein said sensitizing semiconductor is in form of a coating film at the surface of said electron conductor.

3. A heterojunction as claimed in claim 1, characterised in that said sensitizing semiconductor is in form of particles adsorbed at the surface of said electron conductor.

4. A heterojunction as claimed in claim 3, characterised in that said sensitizing semiconductor is in form of quantum-dots.

5. A heterojunction as claimed in claim 1, characterised in that said electron conductor is an n-type semiconductor and said hole conductor is a p-type semiconductor.

6. A heterojunction as claimed in claim 5, characterised in that said n-type semiconductor is a ceramic made of finely divided large band gap metal oxide.

7. A heterojunction as claimed in claim 1, characterised in that said electron conductor is nanocrystalline TiO<sub>2</sub>.

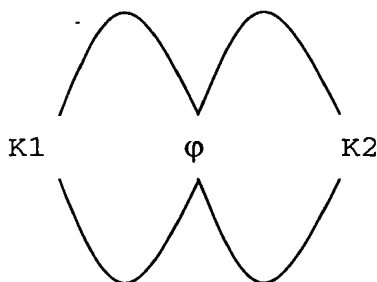
8. A heterojunction as claimed in claim 1, characterised in that said hole conductor is an inorganic hole transporting solid compound.

9. A heterojunction as claimed in claim 1, characterised in that said hole conductor is an amorphous reversibly oxydisable organic **or organomethallic** compound.

10. A heterojunction as claimed in claim 9, characterised in that said organic compound is a polymer.

11. A heterojunction as claimed in claim 1, characterised in that said hole conductor is selected from the group

consisting of Spiro and Heterospirocompounds of general formula (I),



wherein  $\phi$  is one of C, Si, Ge or Sn, and K1 and K2 are independently one from the other conjugated systems.

12. A heterojunction as claimed in claim 11, wherein said hole conductor is OMeTAD.

13. A heterojunction as claimed in claim 4, wherein said quantum dots are particles consisting of PbS, CdS, Bi<sub>2</sub>S<sub>3</sub>, Sb<sub>2</sub>S<sub>3</sub>, Ag<sub>2</sub>S, InAs, **InP**, CdTe, CdSe or HgTe or solid solutions of HgTe/CdTe or HgSe/CdSe.

14. A solid state sensitized photovoltaic cell comprising a layered heterojunction as claimed in claim 1.

15. A cell as claimed in claim 14, characterised in that it comprises

- a transparent first electrode,
- a said layered heterojunction and
- a second electrode.

16. A cell as claimed in claim 15, further comprising a dense semiconductive layer between said first electrode and said layered heterojunction.

17. A cell as claimed in claim 14, characterised in that said layered heterojunction is obtained by forming quantum dots on the surface of said electron conductor by at least one deposition treatment, before providing said hole conductor to said layered heterojunction.

18. A cell as claimed in claim 17, characterised in that said deposition treatment is performed 2-10 times before providing said hole conductor.

c

2025-09-15 10:20:00